

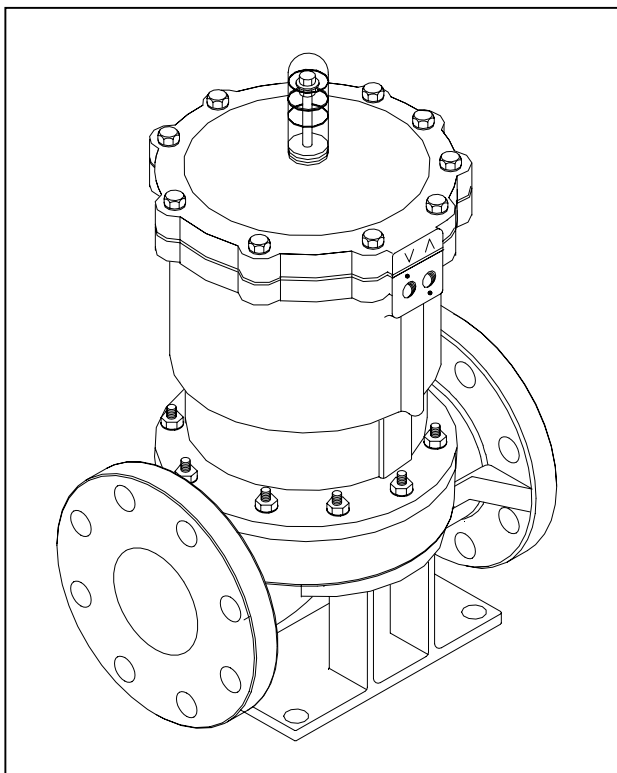
Serial No.

H – A017 E – 2

Contents

# Diaphragm Valve Type 15 Pneumatic Model Type AV

## User's Manual



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**ASAHI AV VALVES**

## (1) General operating instructions

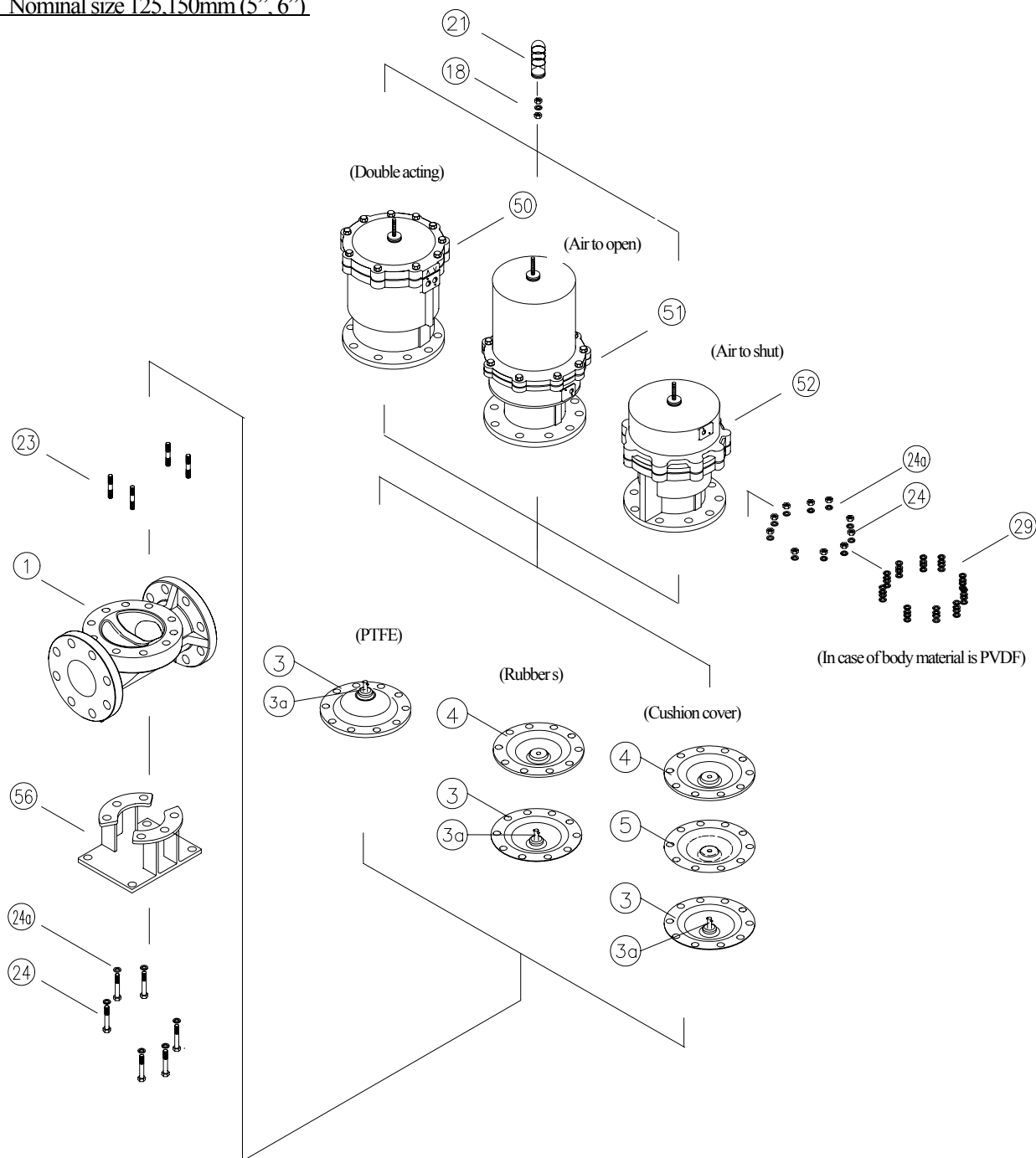
- Operate the valve within the pressure Vs temperature range.  
(The valve can be damaged by operating beyond the allowable range. )
- Select a valve material that is compatible with the media, refer to “CHEMICAL RESISTANCE ON ASAHI AV VALVE”.  
(Some chemicals may damage incompatible valve materials.)
- Diaphragm part may become loose after long term storage or unused period, or by the change of temperature during operation. Check it, and re-tighten the bolt between the actuator and the body diagonally, refer to the torque value on page 17. (The valve may leak.)
- Do not use the valve to fluid containing slurry. (The valve will not operate properly.)
- Do not disassemble the actuator.  
(Injury may occur)
- Do not step on the valve or apply excessive weight on valve. (It can be damaged.)
- Do not exert excessive force in closing the valve.
- Make sure to consult a waste treatment dealer to dispose of the valves.  
(Poisonous gas is generated when the valve is burned improperly.)
- Allow sufficient space for maintenance and inspection.
- Keep the valve away from excessive heat or fire. (It can be deformed or destroyed )
- Set valve support on the valve. (Refer to page7)
- Keep the valve away from places of direct sunlight, water and dust. Use cover to shield the valve.  
(The valve will not operate properly.)
- Do not use AV valves in a place where they may become submerged in water.  
(Submergence will make AV valve fail.)

## (2) General instructions for transportation, unpacking and storage

- Keep the valve packed in the carton or box as delivered until installation.
- Keep the valve away from any coal tar, creosote (antiseptic for wood), termite insecticide, vermicides, and paint.  
(This could cause swelling and damage the valve.)
- Do not impact or drop the valve. (It can be damaged.)
- Avoid scratching the valve with any sharp object.

### (3) Name of parts

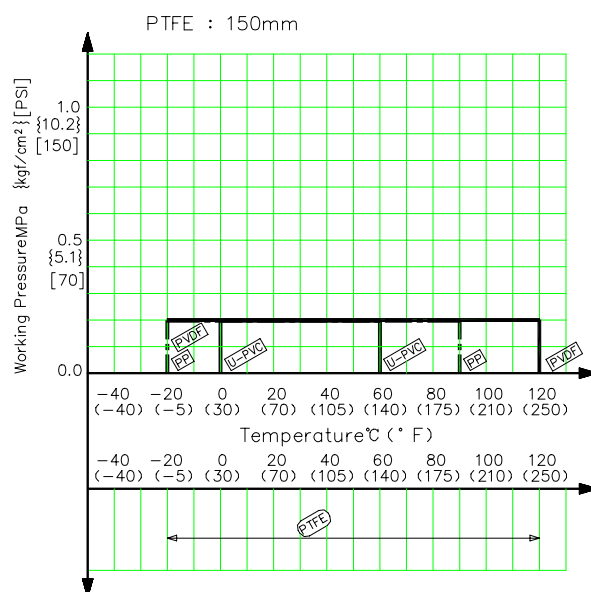
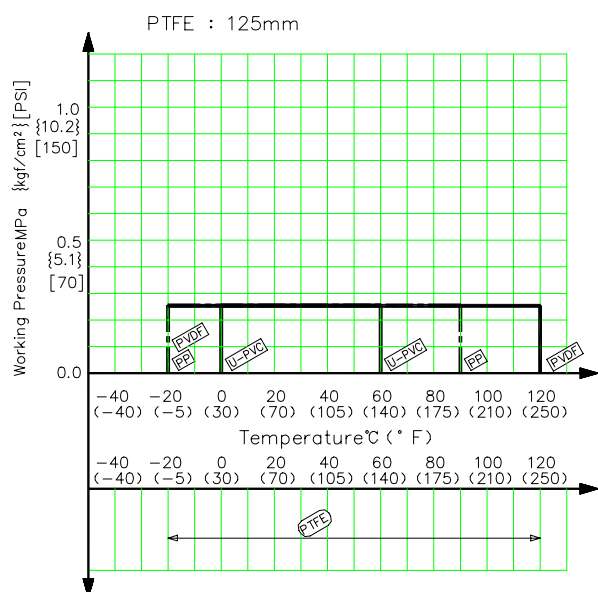
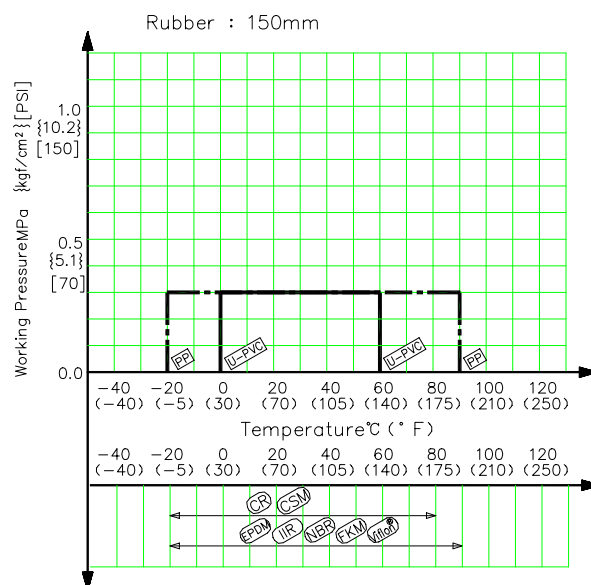
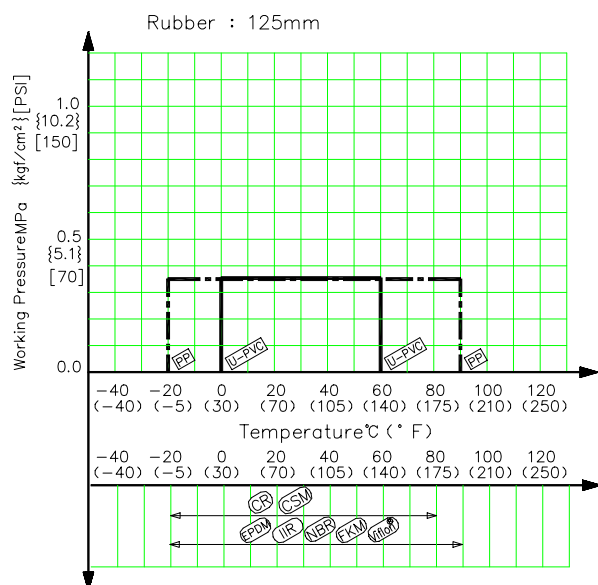
Nominal size 125, 150mm (5", 6")



No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
①	Body	②①	Gauge cover	⑤①	Actuator (double acting)
③	Diaphragm	②③	Bolt-nut	⑤①	Actuator (air to open)
③a	Insert metal of diaphragm	②④	Bolt-nut	⑤②	Actuator (air to shut)
④	Cushion	②④a	Washer	⑤⑥	Stand (A)
⑤	Cushion cover	②⑨	Spring washer (Use with the PVDF body)		
⑧	Stopper				

#### (4) Comparison between working temperature and pressure

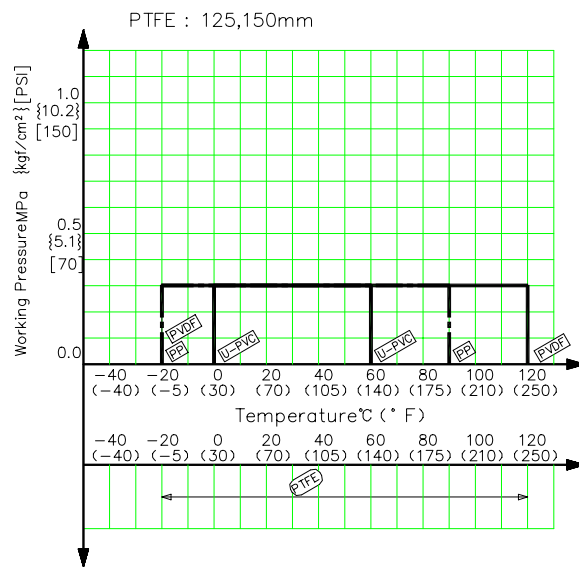
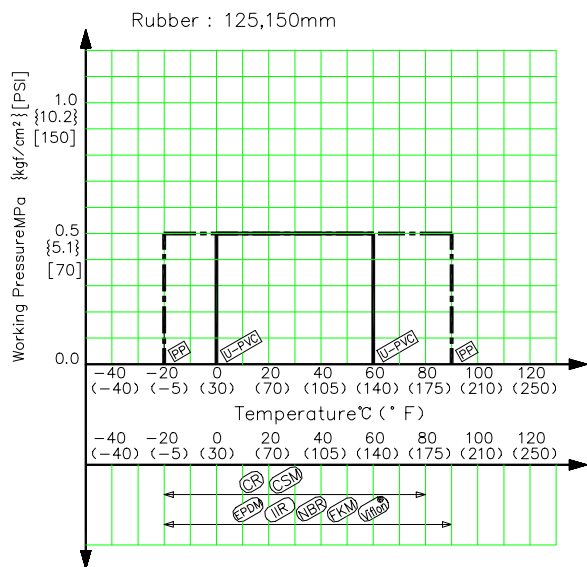
○ Double acting



Caution

Do not operate the valve beyond the range of working temperature and pressure.  
(The valve can be damaged.)

○ Single acting



Caution

Do not operate the valve beyond the range of working temperature and pressure.  
(The valve can be damaged.)

**(5) Specifications of Actuator**

Nominal size		125mm (5")	150mm (6")
Standard operating pressure MPa {kgf/cm <sup>2</sup> }	All type	4.0 {4.1}	
Air consumption N/ per 1 open and close (at 0.4MPa)	Double action type	36.6	67.3
	Air to open type	55.6	84.2
	Air to close type	38.4	60.5
Air supply bore	All type	Rc 1/4	

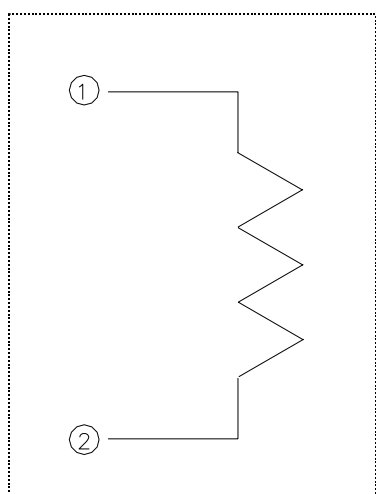
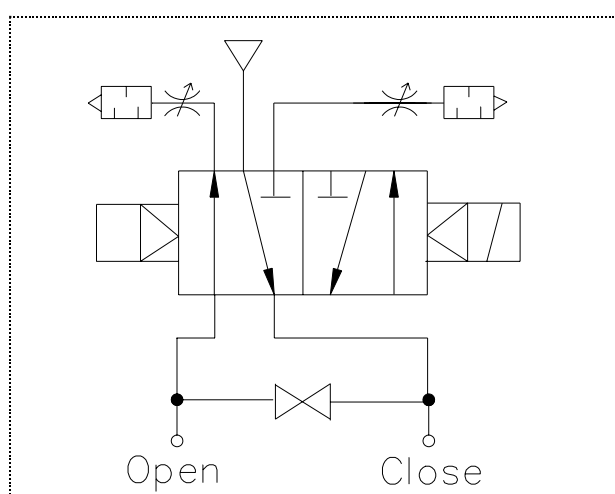
**(6) Specifications of Option****(Specifications of Solenoid valve)**

Actuation	Nom. size	Type sign	Pipe bore	Effective cross section area	Power consumption	Additional function
All type	125, 150mm (5", 6")	4N3S102K -W□-G31193	Rc 1/4	10mm <sup>2</sup> or more	AC : 6VA DC : 5.5W	○ Bypass valve built-in ○ Silencer with needle valve attached (to be used as speed controller)

4N3S102K-W□-G31193

\*( ) is special order.

Specification	sign
AC100V 50/60Hz	1
AC110V 50/60Hz	(2)
AC200V 50/60Hz	3
AC220V 50/60Hz	(4)
DC24V	5
DC48V	(6)
DC100V	(7)
DC125V	(9)

connection diagramJIS sign

## (Specifications of Limit switch)

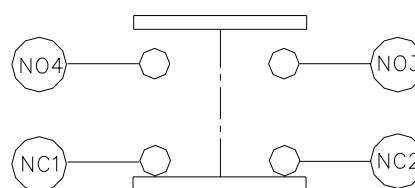
Actuation	Nominal size	Type sign	Protection grade
Double actuation, Single actuation type	125,150mm (5", 6")	1LS1-J	Equivalent to IP55

Limit switch rating

Rate voltage (V)	resistive load (A)	Inductive load (A)
AC125	10	6
AC250	10	6
DC115	0.8	0.2
DC230	0.4	0.1

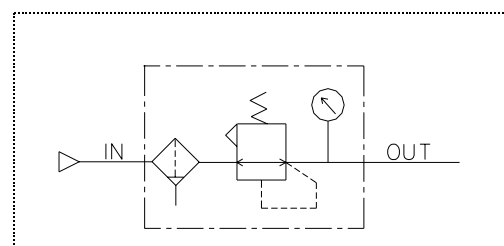
connection diagram

(At intermediate opening)



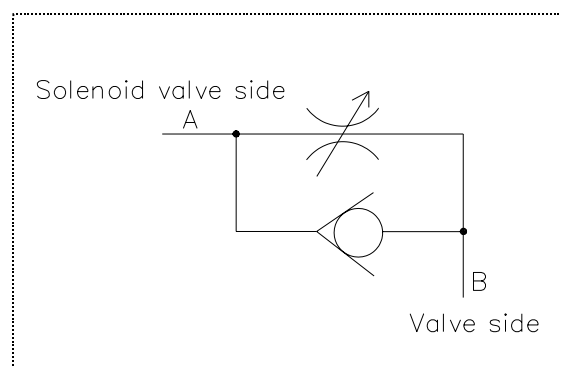
## (Specification of pressure reducing valve with filter)

Actuation	Nom. size	Type sign	Pipe bore	Element degree of filtration
All type	125,150mm (5", 6")	ARU2-02-8A-B	Rc 1/4	5 $\mu$ m

JIS sign

## (Specification of speed controller)

Actuation	Nom. size	Type sign	Pipe bore
All type	125,150mm (5", 6")	SC7-08A	Rc 1/4

JIS sign

Actuation	Effective cross section area		Needle No. of revolution
	Free flow	Control flow	
All type	11.0(0.017)	8.3(0.013)	8turns

## (7) Installation procedure

### Necessary items

- Torque wrench
- AV gasket

(When a non-AV gasket is used, a different tightening torque specification should be followed.)

### Procedure

- 1) Set the AV gasket between the flanges.
- 2) Insert washers and bolts from the pipe side, insert washers and nuts from the valve side, then temporarily tighten them by hand.



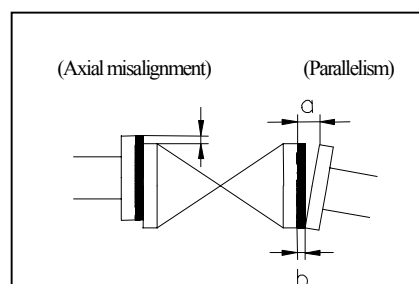
### Caution

The parallelism and axial misalignment of the flange surface should be under the values shown in the following table to prevent damage the valve.

(A failure to observe them can cause destruction due to stress application to the pipe)

Unit : mm(inch)

Nominal size	Axial Misalignment	Parallelism (a-b)
125,150mm (5", 6")	1.0mm (0.04")	1.0mm (0.04")

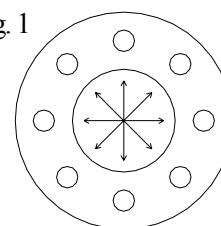


- 3) Using a torque wrench, tighten the bolts and nuts gradually to the specified torque level in a diagonal manner (Refer to fig.1.)

Recommended torque value Unit: N-m {kgf-cm} [lb-inch]

Nom. Size	125mm (5")	150mm (6")
Torque value	40.0 {408} [355]	40.0 {408} [355]

Fig. 1



### Caution

Avoid excessive tightening. (The valve can be damaged.)



## (8) Air piping procedure

### <1> For a standard type and an attached speed controller type

#### Necessary items

- Spanner wrench
- Steel pipe or tube for piping
- Seal tape (If seal tape isn't used, leakage may be caused)
- Joint for steel pipe or tube



#### Caution

Use compressed air as operating fluid. Don't use oil pressure and water pressure.

(Actuator may be damaged.)

Use clean, filtered compressed air.

(Actuator may not work normally.)

When a steel pipe is used for piping, use the pipe the inside of which is treated to be rust preventive.

(The intrusion of rust into the actuator the electromagnetic valve may cause a malfunction.)

Don't forget to remove flash in the screw part of the joint.

(A creak and air leakage may be caused.)

Don't remove the protective plug until piping.

(The intrusion of contaminants and water may cause the malfunction of the actuator.)

Clean the pipe by brushing before piping to prevent the malfunction of the actuator.

### Procedure

- 1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.
- 2) Screw the joint in the piping female screw of the actuator by hand fully.
- 3) Screw the joint one turn with a spanner wrench.

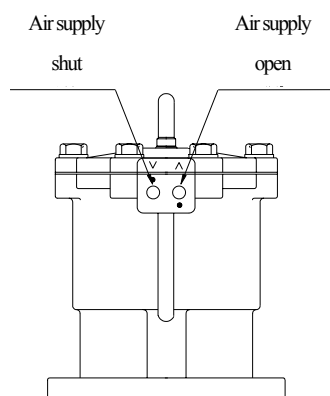


#### Caution

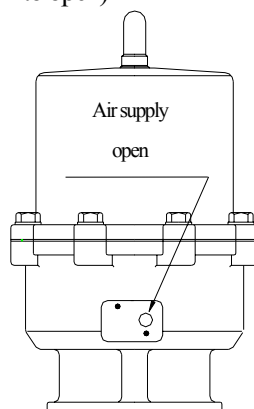
Avoid excessive tightening. (The valve can be damaged.)

- 4) Mount a steel pipe or a tube.

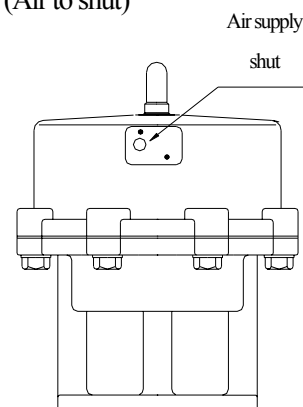
(Double acting)



(Air to open)



(Air to shut)



\*Pictures above have no speed controller, but the piping procedure is the same as above.

<2> For a pressure reducing valve with a solenoid valve and a pressure reducing valve with a filter.

#### Necessary items

- Spanner wrench
- Steel pipe or tube for piping
- Seal tape (If seal tape isn't used, leakage may be caused)
- Joint for steel pipe or tube



#### Caution

Use compressed air as operating fluid. Don't use oil pressure and water pressure.

(Actuator may be damaged.)

Use clean, filtered compressed air.

(Actuator may not work normally.)

When a steel pipe is used for piping, use the pipe the inside of which is treated to be rust preventive.

(The intrusion of rust into the actuator the electromagnetic valve may cause a malfunction.)

Don't forget to remove flash in the screw part of the joint.

(A creak and air leakage may be caused.)

Don't remove the protective plug until piping.

(The intrusion of contaminants and water may cause the malfunction of the actuator.)

Clean the pipe by brushing before piping to prevent the malfunction of the actuator.

#### Procedure

- 1) Wind a seal tape onto the male screw of the joint with a blank about 3mm (about 2 threads) left at the end.
- 2) Screw the joint in the piping female screw of the actuator by hand to the full. (fig.2, 3)
- 3) Screw the joint one turn with a spanner wrench.



#### Caution

Avoid excessive tightening.

(The valve can be damaged.)

- 4) Mount a steel pipe or a tube.

Fig.1

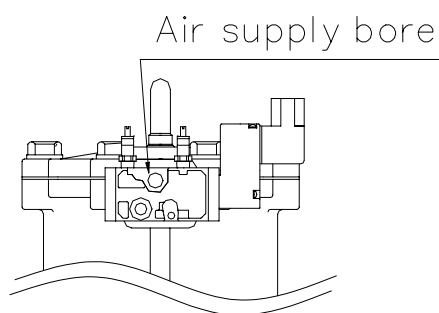
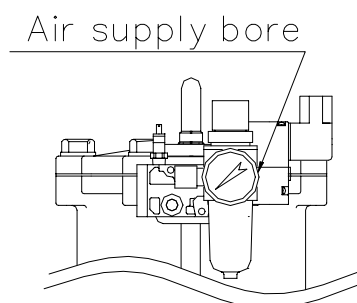


Fig.2



## (9) Support Setting Procedure

### Necessary

● Spanner wrench

● U-type clamp (with bolt)

● Rubber sheet



### Caution

Set the valve support.

(The valve may be damaged because the actuator is heavy.)

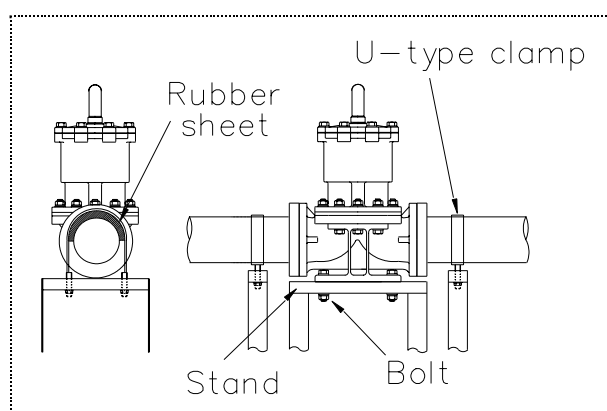
Do not subject valve pump vibrations.

(The valve may be damaged.)

### Level installation

Fix the valve stand and the support stand with bolts.

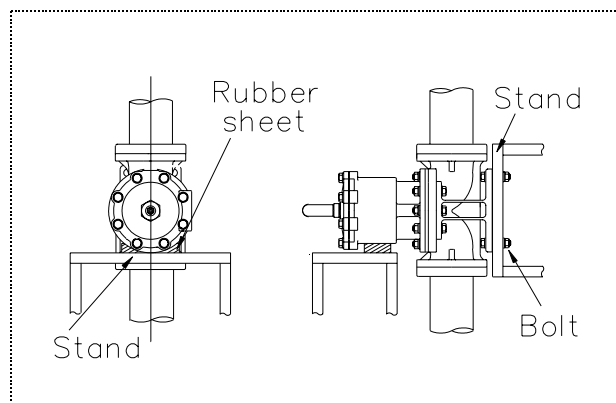
Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



### Perpendicular installation

Fix the valve stand and the support stand with bolts.

Spread the rubber sheet under the actuator and support it with the stand.



## (10) Connection of limit switch procedure

### Necessary items

- Screw driver (+)
- Crimp-style terminal
- Terminal crimping tool
- Connector (G1/2)
- Wire stripper

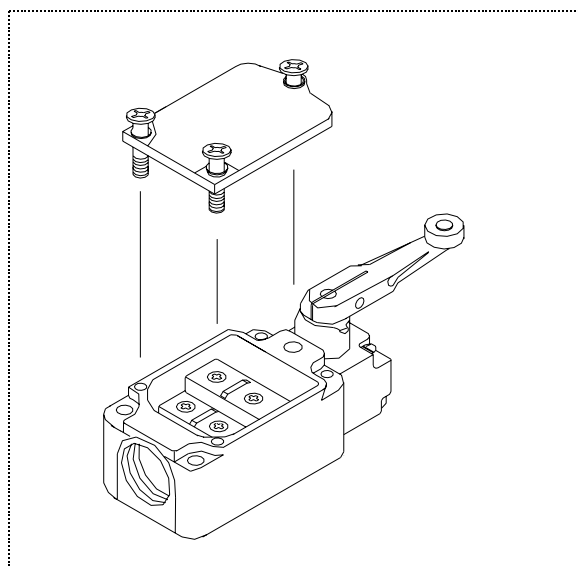
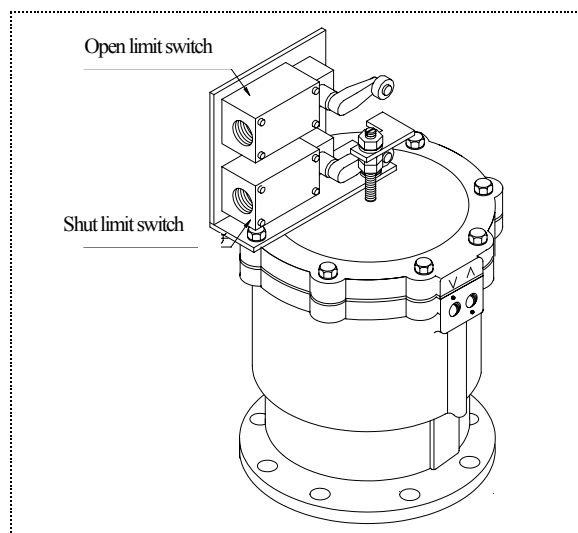
### Procedure

- 1) Loosen the three screws used to attach the limit switch cover with a screwdriver (+) and remove the cover from the limit switch.  
\*These screws are captive.
- 2) Pull and remove the protective cap, made of resin, from the cover.
- 3) Draw the cable through the connector.
- 4) Strip the cable with a wire stripper.
- 5) Install a crimp-style terminal on the lead wire with a terminal crimping tool.
- 6) Connect the terminal screw with a screwdriver (+) according to the internal circuit diagram show in page 6.



**Caution**  
Tighten the screws.  
(If not, electric leaks or shocks may occur.)

- 7) Tighten the above three screws with a screw driver (+) to install the cover on the limit switch.
- 8) Tighten the cable by connector.



## (11) Connection of solenoid valve procedure

### Necessary items

- Terminal crimping tool
- Connector (G1/2)
- Screw driver (+)
- Wire stripper



### Caution

Make sure of the agreement between the power voltage indicated on the solenoid valve and the voltage wiring to be done.

(Wiring with wrong voltage may cause failure in the solenoid unit.)

### Procedure

- 1) Loosen the hexagon socket head cap screws, and remove the cover.



### Caution

Don't loose O-ring.

(Short circuit or shocks may occur.)

- 2) Remove the Faston terminal inserted into coil side and the insulating sleeve.



### Caution

Insulating sleeve isn't attached in Faston terminal.

- 3) Draw the cable through the connector to the cover.
- 4) Strip the cable with wire stripper.
- 5) Draw the lead wire through the cover.
- 6) Install the Faston terminal on the lead wire with a terminal-crimping tool.
- 7) Insert the Faston terminal into the coil side. And fit the cover.
- 8) Tighten the cover setting screws to fix it.  
[The cover can be set with the wire extraction opening turned upward or downward.(fig.3)]
- 9) Tighten the cable by connector.

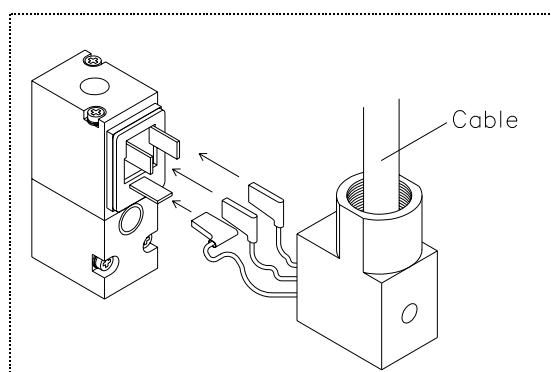
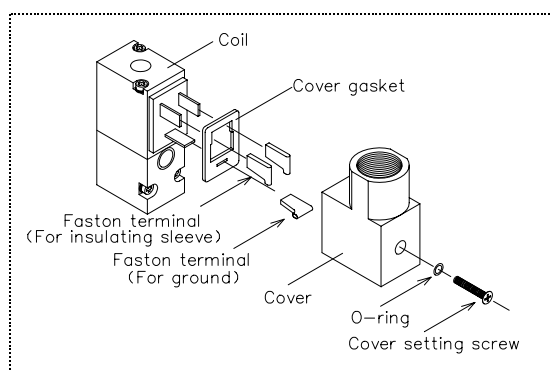
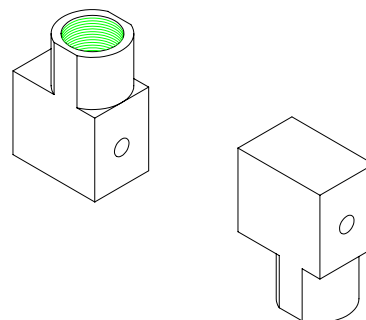


Fig.3



## (12) Operating Procedure

### Procedure



#### Caution

When AV valve is equipped with a solenoid valve, do not leave solenoid valve terminal cover off.

(Contact with the terminal will cause an electric shock.)

Check that the supply pressure of the pressure reducing valve with a filter is 0.4MPa{4.1kgf/cm<sup>2</sup>} or more.

(AV valve may not function.)

### Procedure

- 1) Supply air to the air supply opening.
- 2) Check that the air supplying side and the stopper ⑮ position are matching.



#### Caution

When AV valve is equipped with a fully opened adjustment switch, they do not have stoppers. Check if the valve is open or close by the direction of the fluid.

- 3) Stop supplying air.

<For the solenoid valve>

### Procedure

- 1) Supply the air to the solenoid valve.
- 2) Push the button with a finger, and confirm the action mode shown in the following table.(fig.2)
- 3) Apply regular rated voltage to the solenoid valve, and confirm the action mode shown in the following table.
- 4) Turn off the solenoid valve.

Fig.1

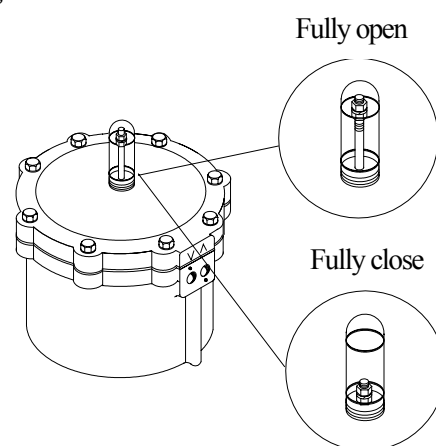
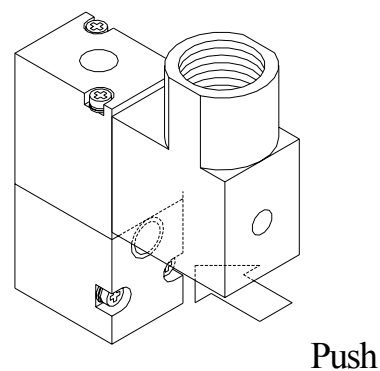


Fig.2



Push button	Current	Double action/Air to open	Air to close
Pushed	On	Open	Shut
Not pushed	Off	Shut	Open

## &lt;Adjustment of opening / closing speed procedure&gt;

○ Double action type

Necessary items

● Spanner wrench

Procedure

- 1) Turn to the right the adjustment knob of the solenoid valve fully.

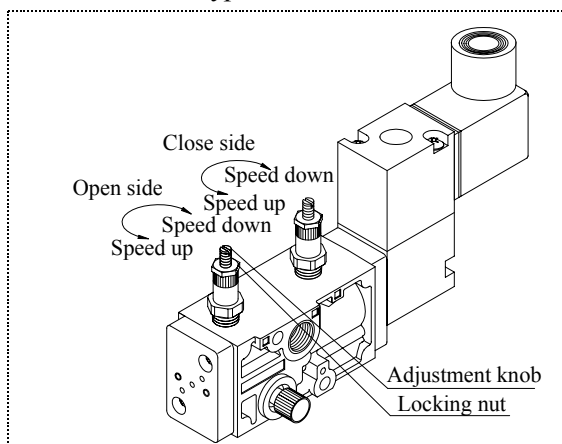
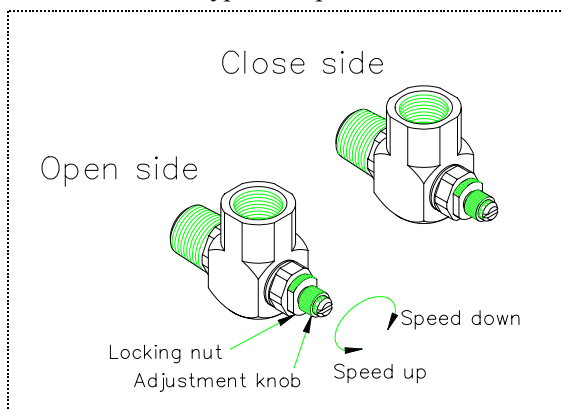


Caution  
Avoid excessive tightening.  
(The speed controller can be damaged.)

- 2) Supply the air to the solenoid valve.
- 3) Apply regular rated voltage to solenoid valve, and turn to the left the open side adjustment knob little by little.
- 4) Turn off the solenoid valve, and turn to the left the shut side adjustment knob little by little.
- 5) Repeat item 3), 4) to adjust the opening / closing speed required.
- 6) When the adjustment is finished, while holding the knob with a finger, fix the adjustment knob by turning the locking nut right with a spanner wrench.



Caution  
Avoid excessive tightening.  
(The locking nut can be damaged.)

For Double action type with solenoid valveFor Double action type with speed controller

## &lt;Adjustment of opening / closing speed procedure&gt;

## ○ Single action type

Necessary items

● Spanner wrench

The actuation type changes the speed-adjustable direction.

Single action	Opening speed	Closing speed
Air to open type	Not adjustable	Adjustable
Air to close type	Adjustable	Not adjustable

Procedure

- 1) Turn right the adjustment knob of the solenoid valve fully.



Caution

Avoid excessive tightening.

(The speed controller can be damaged.)

- 2) Supply the air to the solenoid valve.
- 3) Apply regular rated voltage to solenoid valve, and turn off the solenoid valve, then turn left the adjustment knob little by little to adjust the opening / closing speed required.
- 4) When the adjustment is finished, while holding the knob with a finger, fix the adjustment knob by turning the locking nut right with a spanner wrench.



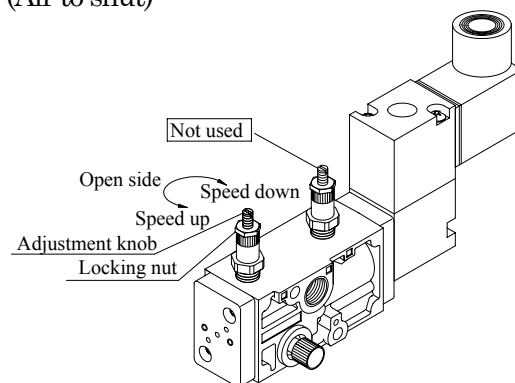
Caution

Avoid excessive tightening.

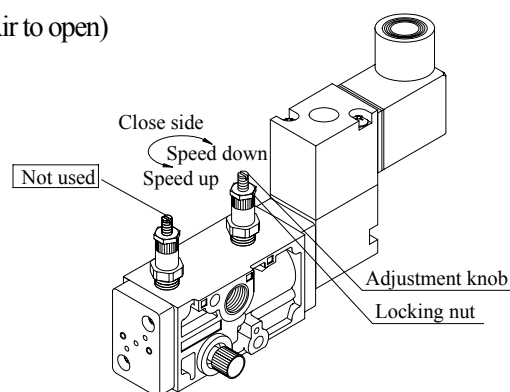
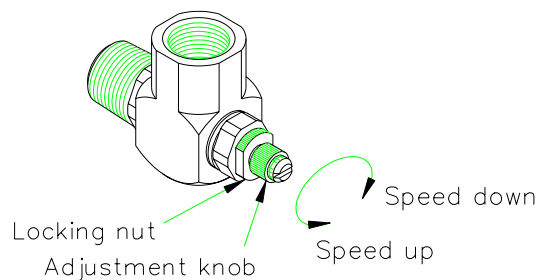
(The locking nut can be damaged.)

For Single action type with solenoid valve

(Air to shut)



(Air to open)

For Single action type with speed controller



### (13) Adjustment procedure for stopper

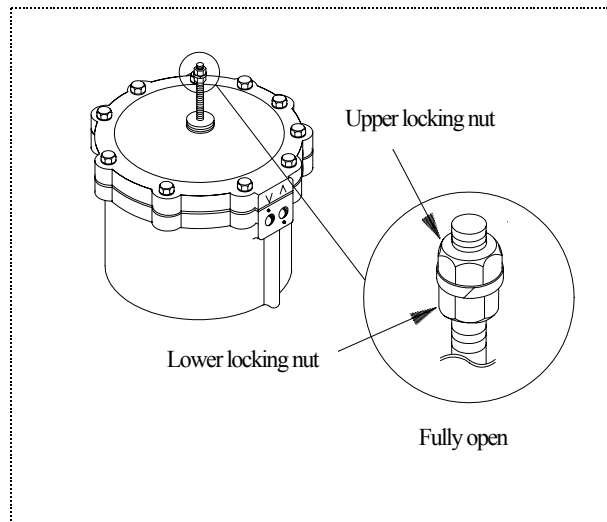
#### Necessary items

● Spanner wrench

● Allen wrench

#### Procedure

- 1) Remove the gauge cover ②① by hand.
- 2) Fully open the valve.
- 3) Loosen the upper part of the locking nut about 1/2 turn.
- 4) Tighten the lower part of the locking nut by turning it left little by little.
- 5) Fix the lower part of the locking nut not to move with a spanner wrench, and tighten the upper part of that.
- 6) Fully close the valve by air operation, and check if it leaks or not. If the valve leaks, repeat the item 2) to 6) until it stops.
- 7) Install the gauge cover ②①.



## (14) Disassembling Method for Replacing Parts

○ Double action and air to open

Necessary items

● Protective gloves

● Safety goggles

● Spanner wrench



Caution

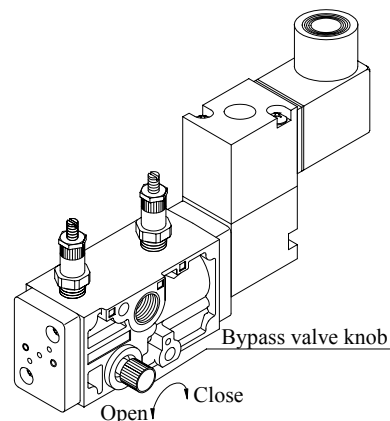
Wear protective gloves and safety goggles as some fluid remains in the valve.  
(Injury may occur.)

<Disassembly>

### Procedure

- 1) Completely discharge fluid from pipes.
- 2) Shut the main air valve, and open the bypass valve to discharge the air from the actuator (50), (51).
- 3) Remove the air piping.
- 4) Loosen the bolt nut between the body (1) and the actuator, (50), (51).
- 5) Remove actuators (50), (51).
- 6) Remove the diaphragm (3) by turning it left (counter clockwise).

Fig.1



<Assembly>

### Procedure

- 1) Shape the diaphragm (3) into (fig.2).
- 2) Turn the diaphragm (3) right (clockwise) to set. Tighten it up completely, and turn it left so that the center rib of diaphragm accords with the longer rib of compressor.
- 3) Shape the diaphragm (3) into (fig.3).
- 4) Supply the air to the actuator (50), (51) and fully open the valve.
- 5) Put the actuator (50), (51) on the body (1).
- 6) Set the Blot-nut (24) and tighten the body (1) and actuator (50), (51).  
(As to the body tightening torque, refer to Table 1.)

Fig.2

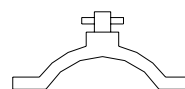
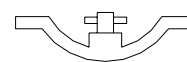


Fig.3



(Table 1.) Body tightening torque value Unit: N·m {kgf·cm}

Nom. Size Diaphragm material	125mm (5")	150mm (6")
Rubber	45 {459}	45 {459}
PTFE	45 {459}	45 {459}

○ Air to shut

#### Necessary items

- |                     |                  |
|---------------------|------------------|
| ● Spanner wrench    | ● Allen wrench   |
| ● Protective gloves | ● Safety goggles |



#### Caution

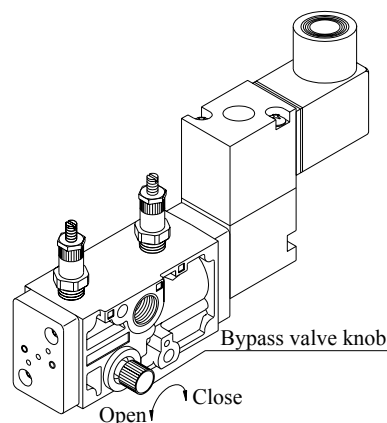
Wear protective gloves and safety goggles as some fluid remains in the valve.  
(Injure may occur.)

#### <Disassemble>

##### Procedure

- 1) Completely discharge fluid from line.
- 2) Remove the gauge cover (21). Fully close the valve by air operation.
- 3) Shut the main air valve, and open the bypass valve to discharge the air from the actuator (50), (51).
- 4) Remove the air piping.
- 5) Loosen the bolt nut (24) between the body (1) and the actuator (52).
- 6) Remove actuators (50), (51).
- 7) Remove the diaphragm (3) by turning it left (counter clockwise).

Fig.1



#### <Assembly>

##### Procedure

- 1) Shape the diaphragm (3) into (fig.2).
- 2) Turn the diaphragm (3) right (clockwise) to set. Tighten it up completely, and turn it left so that the center rib of diaphragm accords with the longer rib of compressor.
- 3) Shape the diaphragm (3) into (fig.3).
- 4) Put the actuator (50), (51) on the body (1).
- 5) Set the Bolt-nut (24) and tighten the body (1) and actuator (50), (51).

(As to the body tightening torque, refer to table 1 on page 17.)

Fig.2

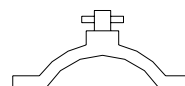
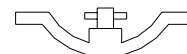


Fig.3



**(15) Inspection items**

○ Periodically inspect and maintain the AV valve in accordance with the decided schedule.

Portion to be inspected	Inspection item
Actuator	1) Existence of rust, peeling of paint, and dirt of inspection hole of valve travel indicator. 2) Tightening condition of respective threaded portions. (Loose or not) 3) Existence of abnormality in opening and closing operating sounds.  * It is unnecessary to supply oil to this actuator.
Valve	1) Existence of scratches, cracks, deformation, and discoloring. 2) Existence of leakage from the valve to the outside. 3) Existence of leakage when the valve is opened fully at right or left. 4) Tightening condition of bolt (B)(loose or not).

**(16) Troubleshooting**

Problem	Cause	Treatment
The valve does not operate by air operations	The power source of the control panel is turned off.	Turn on the power source.
	The solenoid valve is disconnected.	Check the connection again. (Refer to page 5)
	Air is not supplied to the solenoid valve.	Supply air to solenoid valve.
	The supply voltage to the solenoid valve is wrong.	Check voltage with a tester and set specified voltage.
	The voltage to the solenoid valve is low.	
	The bypass valve opens.	Closed bypass valve by turning the bypass valve knob in a clockwise direction.
	The speed controller's knob is fully turned in a clockwise direction.	Turn speed controller's knob in a counterclockwise direction.
	The operation pressure is low.	Check the operating pressure.
	The diaphragm is worn.	Replace the diaphragm with a new one. (Refer to page 17, 18)
	The diaphragm or the body is scratched.	Replace scratched parts with new ones. (Refer to page 17, 18)

Problem	Cause	Treatment
Fluid leaks from the valve.	The bolt between the body and actuator is loose.	Tighten the bolt to the specified torque. (Refer to page 17).
	The diaphragm or the body is scratched.	Replace scratched parts with new one.
	There is foreign matter between the diaphragm and the body.	Disassemble valve to remove foreign matter. (Refer to page 17, 18)
The actuator operates, but the valve does not open or close.	The diaphragm or the joint metal fitting is broken.	Replace broken parts. (Refer to page 17, 18)

### (17) Handling of residual and waste materials



#### Caution

In discarding remaining or waste materials, be sure to ask waste service company.  
(Poisonous gas is generated.)

**(18) Inquiries****ASAHI ORGANIC CHEMICALS INDUSTRY CO., LTD.**

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**Distributor**

## **Diaphragm Valve Type 15 Pneumatic Model Type AV**

[Automatic Valve]



**ASAHI AV VALVES**

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